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From: Peterson, Mary
Sent: Wednesday, October 08, 2014 1:17 PM
To: Kiefer, Robyn V NWK
Cc: Slugantz, Lynn; Field, Jeff; Gravatt, Dan
Subject: Draft powerpoint for Oct 14 CAG
Attachments: WL-CAG-10-14-14_v 3.pptx

Attached is our draft presentation for the CAG meeting next week. We are still tweaking it internally, but I wanted to give you a chance to review it in advance of our call on Friday. You can provide comments on the call and we can revise it collaboratively.

I am beginning to work on a Q&A, brainstorming questions that this presentation may trigger. I will share that with you as soon as I have a working draft developed. We can discuss that on Friday as well.

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Superfund

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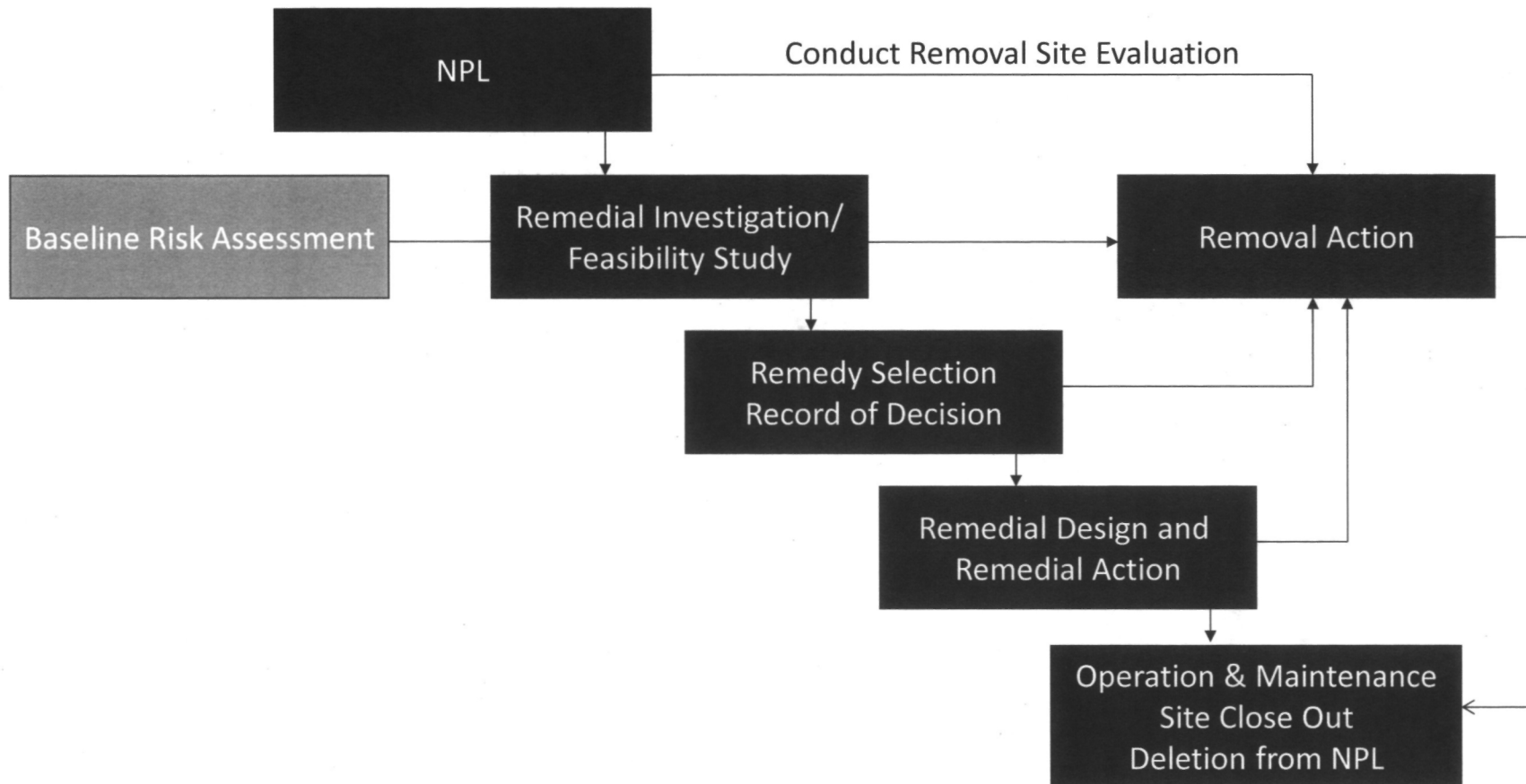
Key Provisions of CERCLA

(Comprehensive Environmental Response, Compensation and Liability Act)

- ▶ Provides legal authority to respond to a release of:
 - ▶ A hazardous substance
 - ▶ Any pollutant or contaminant that may present an imminent and substantial endangerment
- ▶ Authorizes three types of response actions:
 - ▶ Removal action
 - ▶ Remedial action
 - ▶ Enforcement action



How Are NPL Sites Handled?



Overview of the Remedial Investigation/Feasibility Study Process

- ▶ RI/FS supports selection of the remedy
- ▶ RI characterizes the site
- ▶ Baseline Risk Assessment (BLRA) characterizes human health risks associated with exposures at the site
- ▶ FS develops and analyzes remedial action alternatives



On-site stakeholder discussions

Baseline Risk Assessments

- ▶ Purpose - evaluate threat with no action
- ▶ National Control Plan (NCP) requirements
 - ▶ Lead agency shall conduct site-specific baseline risk assessment
 - ▶ Characterize current and potential threats
- ▶ Quantification of risks
 - ▶ Establish acceptable exposure levels
 - ▶ Help set priorities

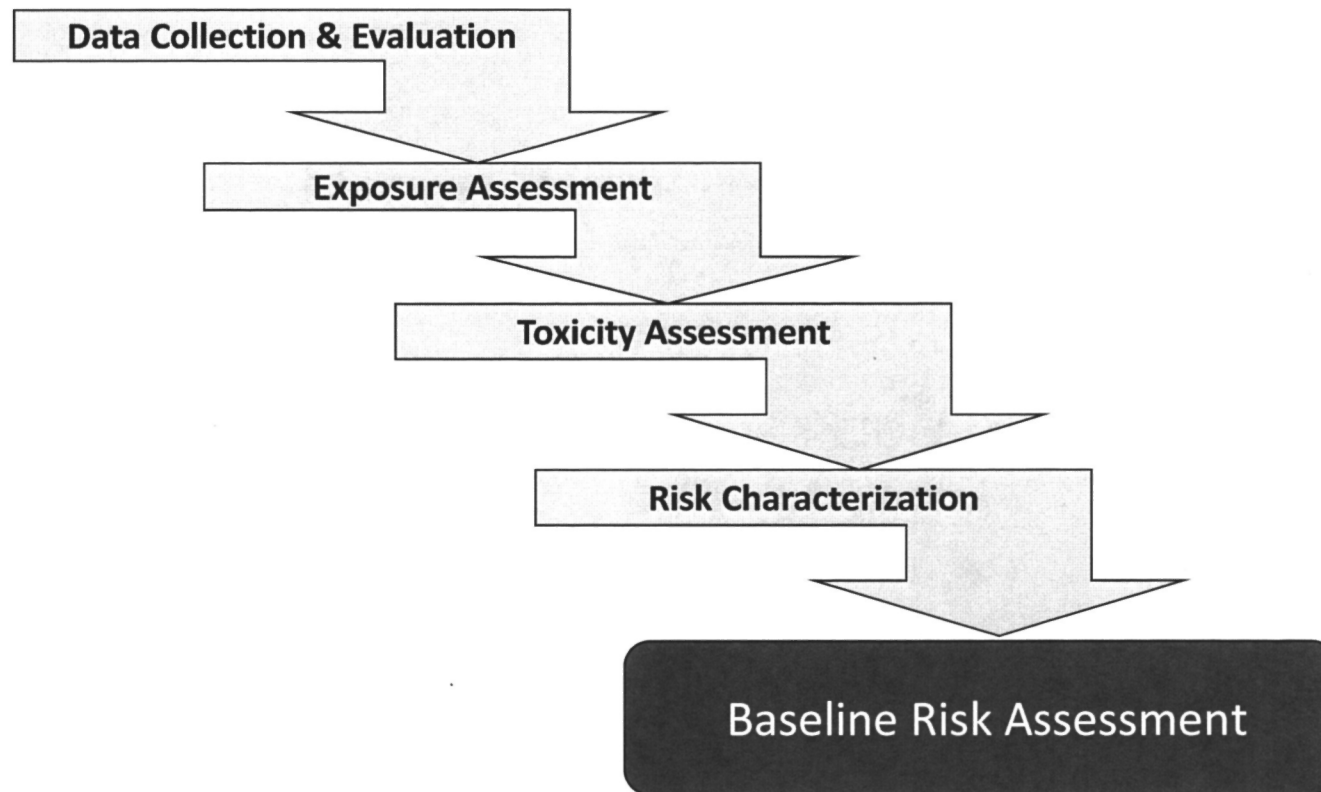
Baseline Risk Assessments

- ▶ A Baseline Risk Assessment *IS*:
 - ▶ An analysis of the potential adverse health effects (*current* or *future*) caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases (i.e., under an assumption of no action).
- ▶ A Baseline Risk Assessment does *NOT*:
 - ▶ Link individual illnesses to *past* chemical exposures
 - ▶ Prove that a specific toxic substance caused an individual's illness

The Risk Assessment Equation

- ▶ Risk = Toxicity x Exposure
- ▶ Risk is a function of toxicity (the inherent ability of a chemical to do harm) and exposure (the amount of chemical that an individual contacts)
- ▶ In the absence of exposure (i.e., a complete exposure pathway), risk is zero

Components of the Baseline Risk Assessment



Data Collection & Evaluation

- ▶ Collect samples - air, water, soil, etc.
- ▶ Sample results reveal the types and amounts of chemicals present at the site
- ▶ Develop a list of contaminants at the site

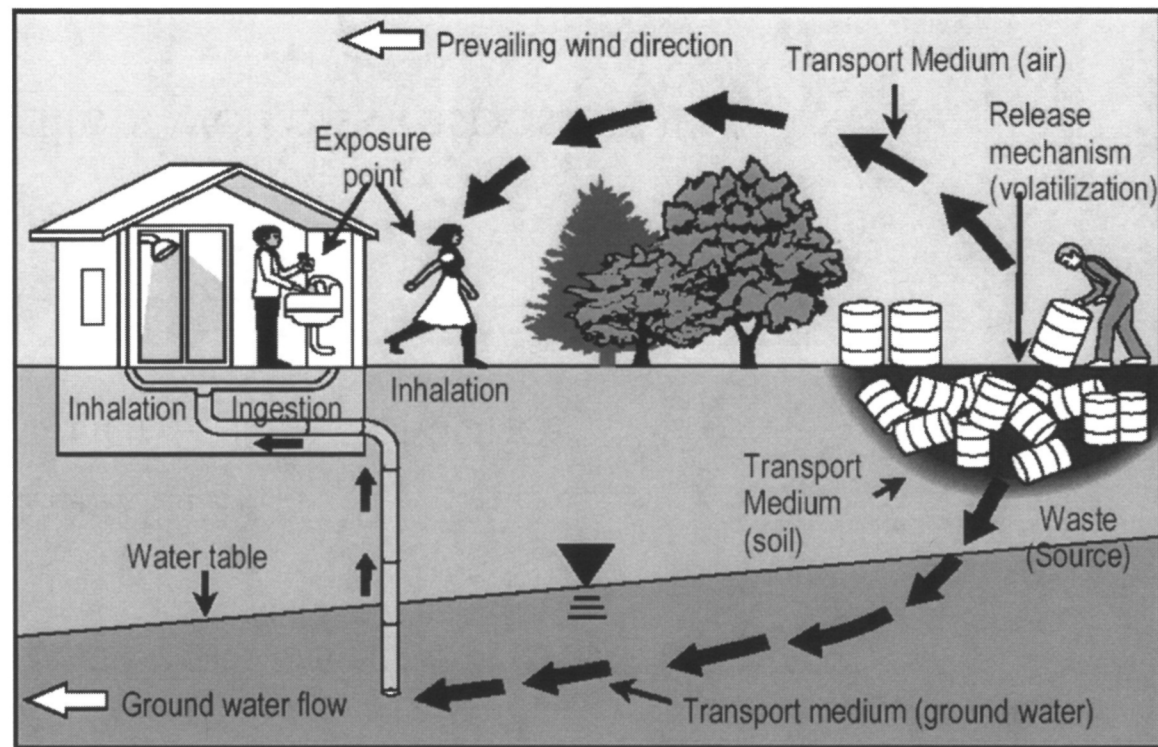
Exposure Assessment

How much of the chemical are people being exposed to over what period of time?

- ▶ Characterize the exposure setting
 - ▶ Physical environment (Urban, rural, parkland, stream, etc.)
 - ▶ Potentially exposed populations
 - ▶ Who will be exposed?
 - ▶ residential, recreation, workers, trespassers
 - ▶ adults, children
 - ▶ How long will people be exposed?
 - ▶ How often will people be exposed?

Exposure Assessment

- Identify exposure pathways
 - Exposure medium (soil, air, water, food)
 - How much of each chemical people may be exposed to
 - Exposure routes (ingestion, inhalation, dermal)



From: http://dec.alaska.gov/spar/csp/guidance/humhealth_ra.pdf

Toxicity Assessment

Is the chemical harmful to humans?

What amount of injury is this level of exposure likely to cause?

- ▶ Hazard Identification

- ▶ Determine if chemical can cause adverse health effect
- ▶ Is adverse health effect likely to occur in humans
- ▶ Cancer and noncancer effects are evaluated separately

Toxicity Assessment

- ▶ Dose-Response Assessment
 - ▶ Quantifies the relationship between exposure and adverse health effects
 - ▶ Cancer Effects
 - ▶ Assume there are no exposures that have “zero risk”
 - ▶ Estimate the probability of cancer developing
 - ▶ Noncancer Effects
 - ▶ Typically become more severe as exposure to a chemical increases
 - ▶ Threshold values developed for noncancer causing chemicals

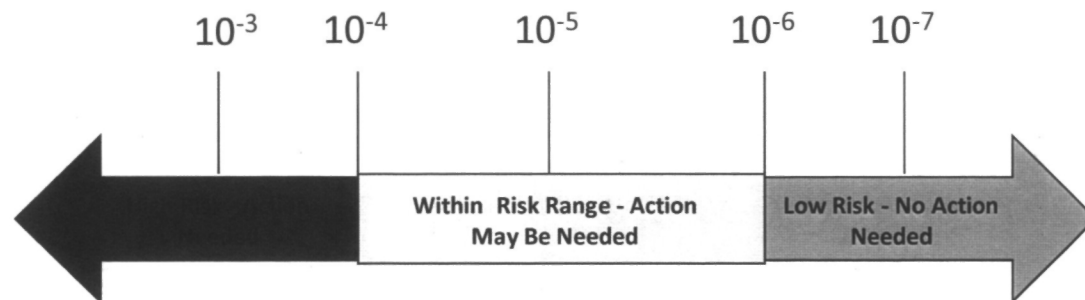
Risk Characterization

What is the extra risk to human health caused by this amount of exposure to this chemical/chemicals?

- ▶ Integrate results of the data collection & evaluation, exposure assessment, and toxicity assessment
- ▶ Quantify the excess individual lifetime cancer risk
 - ▶ Cancer risk is expressed as a probability (1 in 10,000 or 1E-04 or 0.0001)
 - ▶ Superfund manages cancer risk within a target risk range of 1E-06 to 1E-04
- ▶ Quantify the noncancer hazard quotient (HQ)
 - ▶ Compare exposure or intake to the dose that is unlikely to cause adverse health effects
 - ▶ A hazard quotient is not a probability
 - ▶ $HQ > 1$ indicates the potential exists for adverse health effects
- ▶ Assess and Present Uncertainty

Carcinogenic Risk Range: Triggering Action

- ▶ Compare quantified carcinogenic risks to the target risk range
 - ▶ Risks that exceed 10^{-4}
 - ▶ Risks that fall within the target range
 - ▶ Risks that are lower than 10^{-6}



Noncancer Hazard Quotient (HQ)

- ▶ Is expressed as a ratio
- ▶ Indicates likelihood of adverse health effects
- ▶ Is not a statistical probability

$$HQ = \left(\frac{\text{Exposure level}}{\text{Reference dose}} \right)$$

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment (2000)

- ▶ Operable Unit 1 consists of:
 - ▶ Two localized areas – Areas 1 and 2
 - ▶ Ford Property



Summary of the West Lake Landfill OU-1 Baseline Risk Assessment (2000)

► Objectives

- Estimate potential health risks associated with the site if no cleanup action was taken
- Identify the areas, environmental media, and contaminants that pose the primary human health concerns
- Identify any existing data gaps so that additional information can be collected to support cleanup decisions
- Provide a baseline for comparing the protectiveness of cleanup alternatives in the Feasibility Study

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment

- ▶ Data Collection and Evaluation
 - ▶ Data for OU1 were evaluated to establish
 1. Detected chemicals that are site-related
 2. Data that are of sufficient quality for use in the risk assessment
- ▶ Contaminants of Potential Concern
 - ▶ Radiological: uranium-238, uranium-235, thorium-232, and associated decay products (U-234, Th-230, Ra-226, Pb-210, Pa-231)
 - ▶ Nonradiological: arsenic, aroclor-1254 (Area 1); arsenic, lead, uranium, and aroclor 1254 (Area 2)

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment

- ▶ Contaminants of Potential Concern
 - ▶ Radiological: uranium-238, uranium-235, thorium-232, and associated decay products (uranium-234, thorium-230, radium-226, lead-210, protactinium-231)
 - ▶ Nonradiological: arsenic, aroclor-1254 (Area 1); arsenic, lead, uranium, and aroclor 1254 (Area 2)

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment

► Exposure Assessment

► Routes of Exposure

- External radiation from contaminated soil
- Inhalation of dust and gas
- Dermal contact with contaminated soil
- Incidental Ingestion of soil

► Potential Receptors

► Current Use

- Groundskeeper – Working adjacent to OU-1
- Groundskeeper – Ford Property

► Future Use

- Groundskeeper – Working on OU-1
- Groundskeeper – Ford Property
- User of a building adjacent to Areas 1 and 2 who uses areas for parking
- Outdoor Storage Yard Worker

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment

- ▶ Potential Receptors
 - ▶ Current Use
 - ▶ Groundskeeper – Working adjacent to OU-1
 - ▶ Groundskeeper – Ford Property
 - ▶ Future Use
 - ▶ Groundskeeper – Working on OU-1
 - ▶ Groundskeeper – Ford Property
 - ▶ User of a building adjacent to Areas 1 and 2 who uses areas for parking
 - ▶ Outdoor Storage Yard Worker

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment



- ▶ Toxicity Assessment
 - ▶ Hazard Identification
 - ▶ Dose-Response Assessment
 - ▶ Carcinogenic Slope Factors
 - ▶ Noncarcinogen Reference Doses

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment

- ▶ Risk Characterization
 - ▶ Health Risks Under Current Conditions
 - ▶ All receptor scenarios produce risks that are within the target risk range of $1\text{E-}06$ to $1\text{E-}04$

Summary of the West Lake Landfill OU-1 Baseline Risk Assessment

- ▶ Health Risks Under Future Conditions

- ▶ Radionuclides

- ▶ Calculated risks from radiological COPCs for some potential future exposure scenarios are at the upper end of, or exceed the target risk range of $1\text{E-}06$ to $1\text{E-}04$

- ▶ Non-Radionuclides

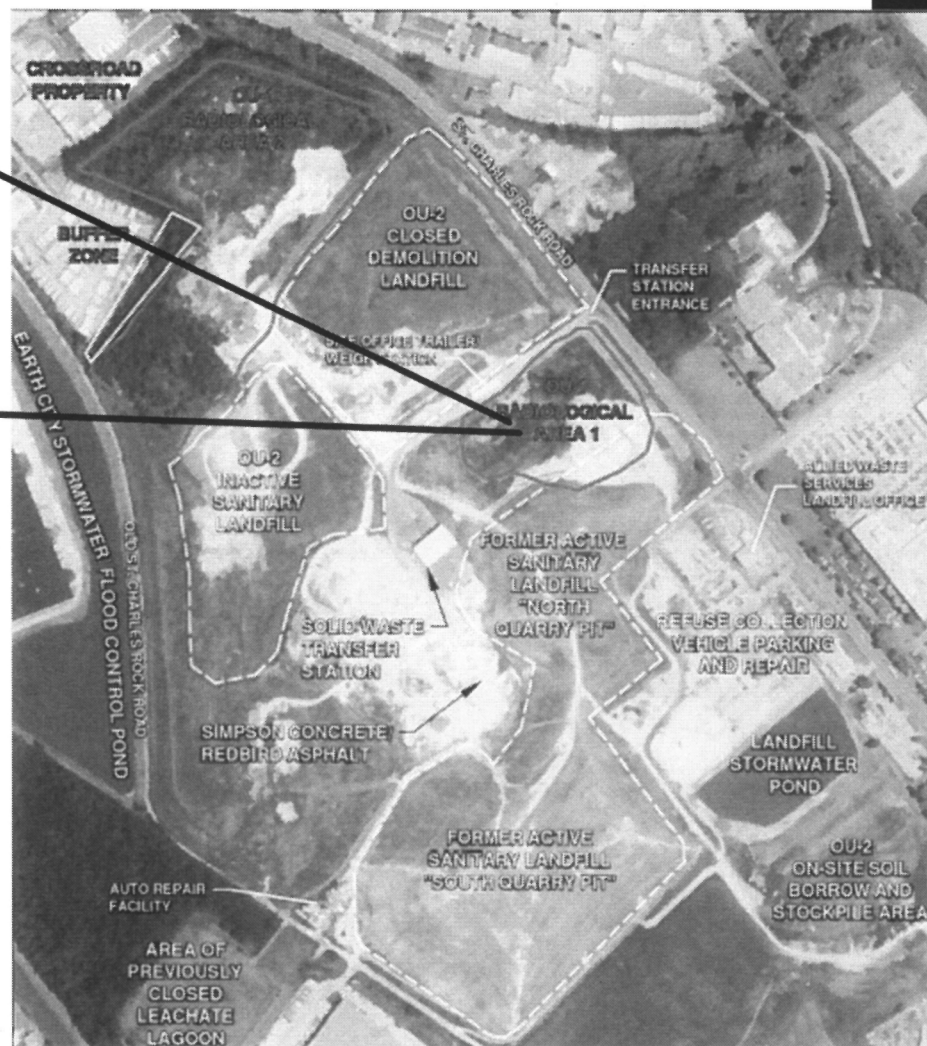
- ▶ Non-radiological contaminants are not expected to cause unacceptable risks for the scenarios evaluated.

OU-1, Area 1 (Current Scenario)

Potential Receptor	Location	Radionuclide Cancer Risk
Groundskeeper	Adjacent to Area 1	1E-05

OU-1, Area 1 (Future Scenario)

Potential Receptor	Location	Radionuclide Cancer Risk
Groundskeeper	On Area 1	6E-05
Adjacent Building User	Area 1 (Paved and used for parking)	1E-05
Storage Yard Worker	On Area 1	1E-04



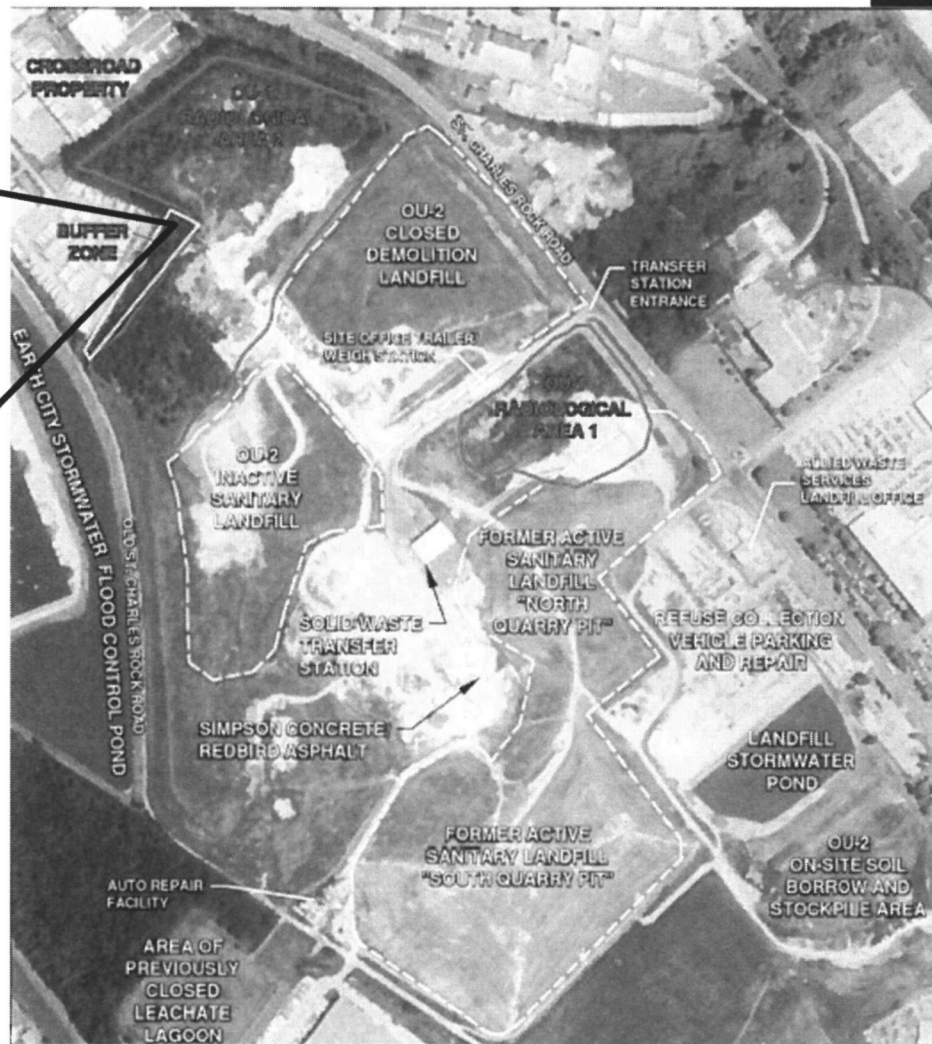
*Target Risk Range is 1E-06 to 1E-04

OU-1, Ford Property (Current Scenario)

Potential Receptor	Location	Radionuclide Cancer Risk
Groundskeeper	On Area	6E-07

OU-1, Ford Property (Future Scenario)

Potential Receptor	Location	Radionuclide Cancer Risk
Groundskeeper	On Area	6E-07



*Target Risk Range is 1E-06 to 1E-04

OU-1, Area 2 (Current Scenario)

Potential Receptor	Location	Radionuclide Cancer Risk
Groundskeeper	Adjacent to Area 2	4E-05

OU-1, Area 2 (Future Scenario)

Potential Receptor	Location	Radionuclide Cancer Risk
Groundskeeper	On Area 2	2E-04
Adjacent Building User	Area 2 (Paved and used for parking)	4E-05
Storage Yard Worker	On Area 2	4E-04



*Target Risk Range is 1E-06 to 1E-04

Questions or Comments?

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